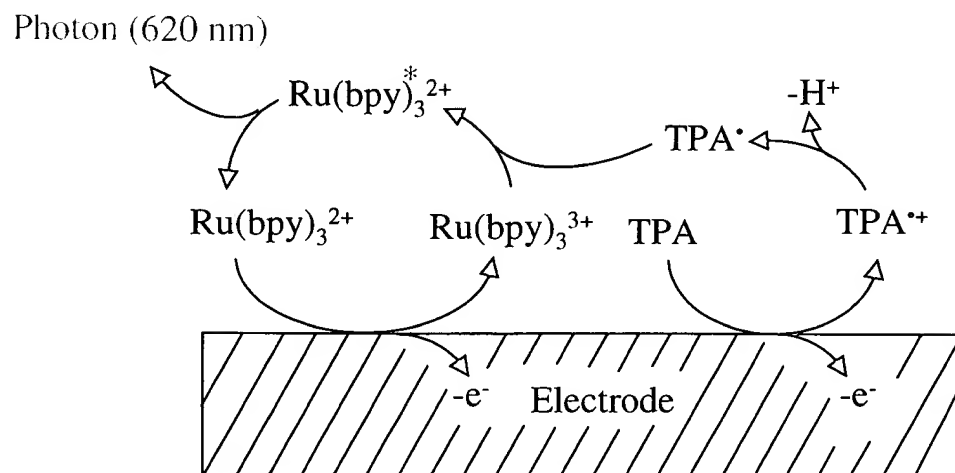


APPENDIX

<u>Figure</u>	<u>Description</u>
1	Overview of Solid-Phase Binding Assays
2	Proposed Mechanism of ECL Detection with $\text{Ru}(\text{bpy})_3^{2+}$
3	Current State of the Art in ECL Assays (Magnetic Bead-Based Assays)
4	Schematic Diagram of Present Invention (Multi-Array Multi-Specified Testing)
5	Comparison of ECL Assays Using Beads with Assays Using Reagents Immobilized on Electrodes (One Embodiment of the Present Invention)
6	Schematic Illustrations of (6a) the Leventis Invention, (6b) the Shibue Invention, and (6c) the Combination of Shibue and Leventis

A

Mechanism of ECL Detection With $\text{Ru}(\text{bpy})_3^{2+}$



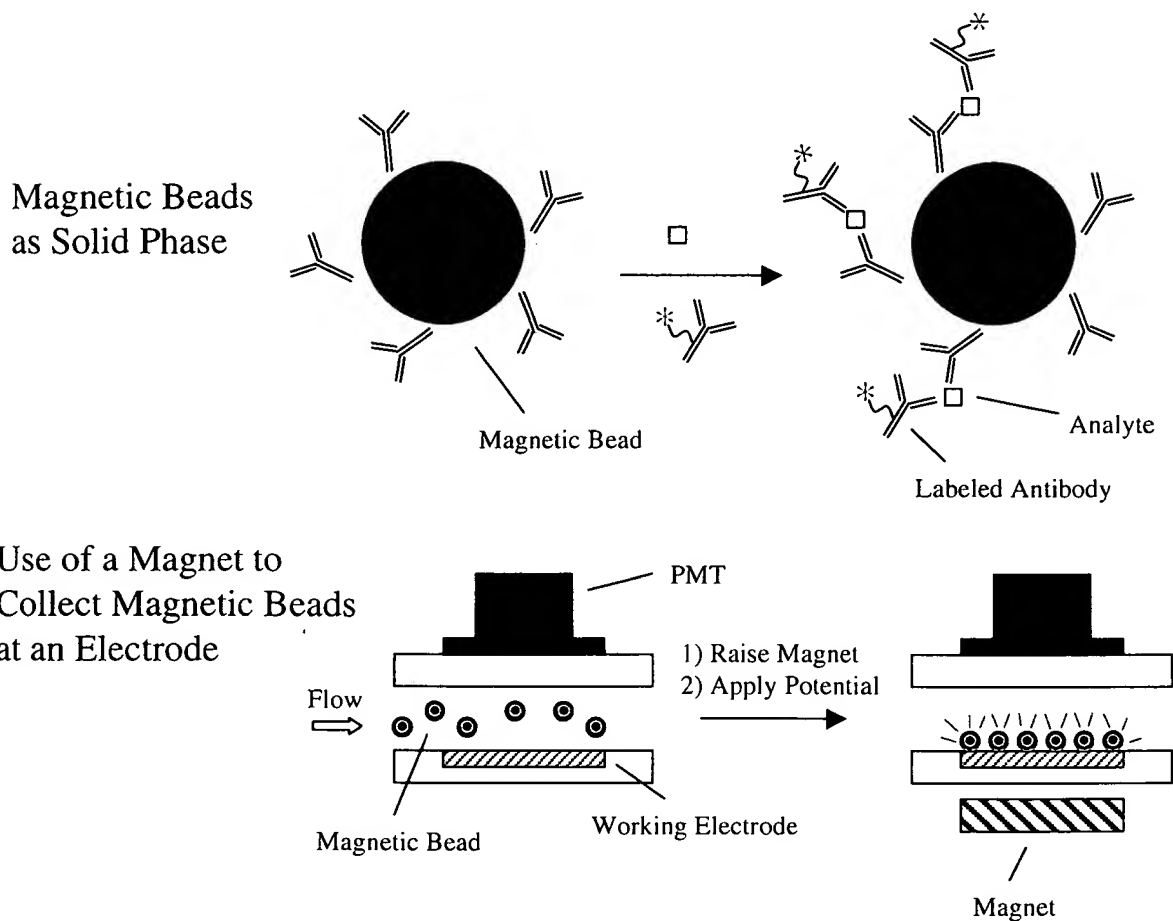
TPA = Tripropylamine

- Reaction is triggered by an applied electrical potential.
- Reaction is confined to the surface of the electrode.
- Electrode must be capable of oxidizing/reducing ECL moiety and coreactant.

A

Current State of the Art in ECL Assays

ORIGEN™ Technology

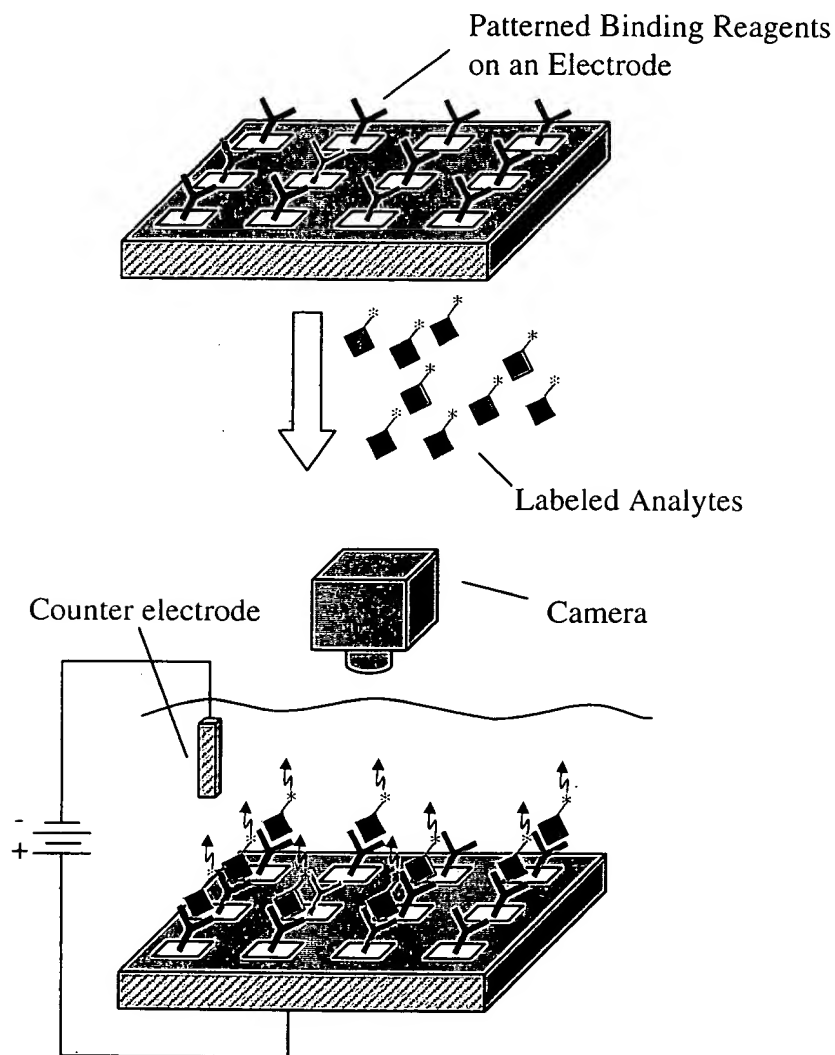


- Magnetic Beads as Solid Phase for Binding Assays.
- Capture of Magnetic Beads on Electrode Surface.
- Scrupulously Clean Electrode.
- Multiple Use Electrode
- One Assay at a Time.

A

FIG. 3

Multi-Array Multi-Specific ECL Testing

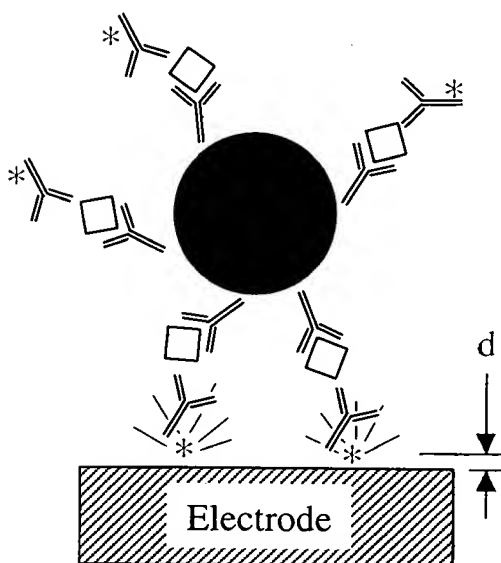


- Binding reagents are immobilized directly on the working electrode.
- Binding reagents for different analytes are patterned on the electrode.
- A plurality of different analytes in a sample are determined simultaneously by imaging ECL generated at the surface.
- The method does not require the use of more than one type of ECL label.
- Alternate embodiments:
 - 1) Multiple electrodes supporting different binding reagents: different analytes determined by sequential triggering of electrodes.
 - 2) Binding reagents patterned on a surface other than the electrode: second surface is placed in contact with electrode to trigger ECL.

A

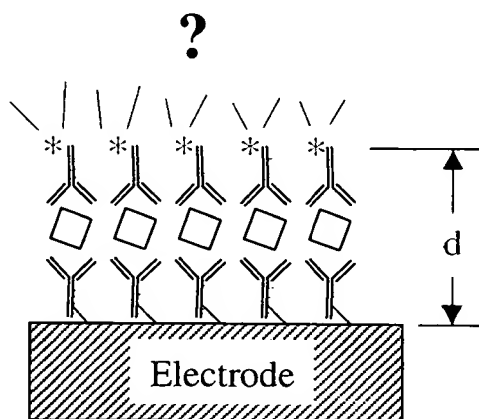
Comparison of ECL Assays Using Magnetic Beads with Assays Using Binding Reagents Immobilized Directly on an Electrode

Excitation of ECL During Magnetic Bead-Based Assay



- Label and coreactant come into contact with clean electrode

Excitation of ECL During Assay Using Binding Reagents Immobilized on a Electrode

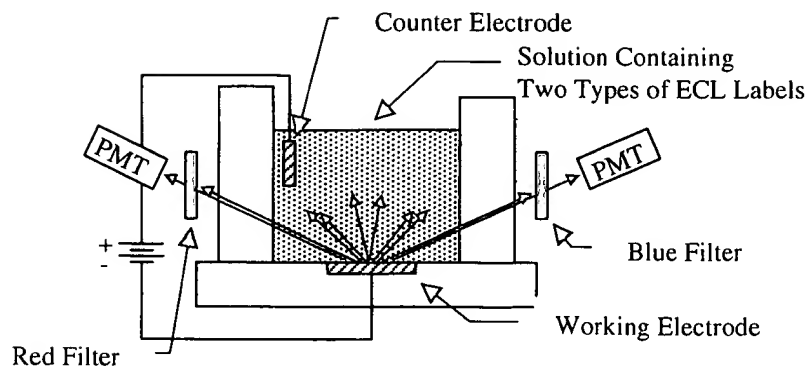


- Electron-transfer to label and coreactant occurs through a thick organic layer

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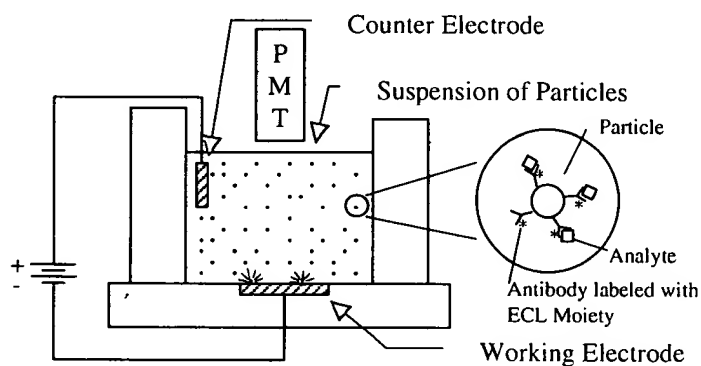
FIG. 5

Leventis:



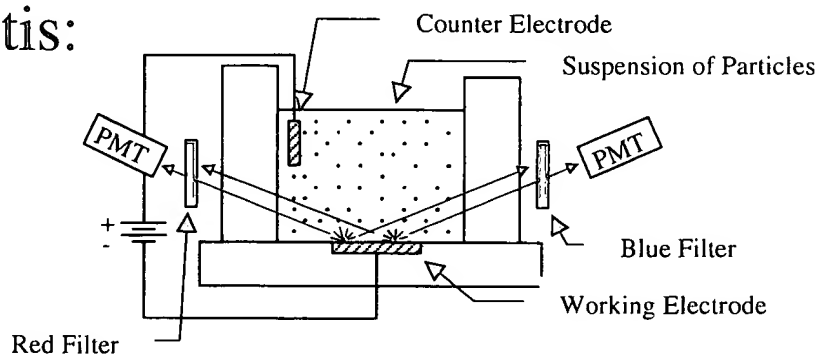
- Distinguishes between ECL moieties on the basis of color.
 - ECL moieties are in solution and diffuse to the electrode.
-

Shibue:



- Binding of analyte decreases ECL signal from ECL moieties on antibody immobilized on particle.
 - ECL moieties are in suspension and diffuse to the electrode.
-

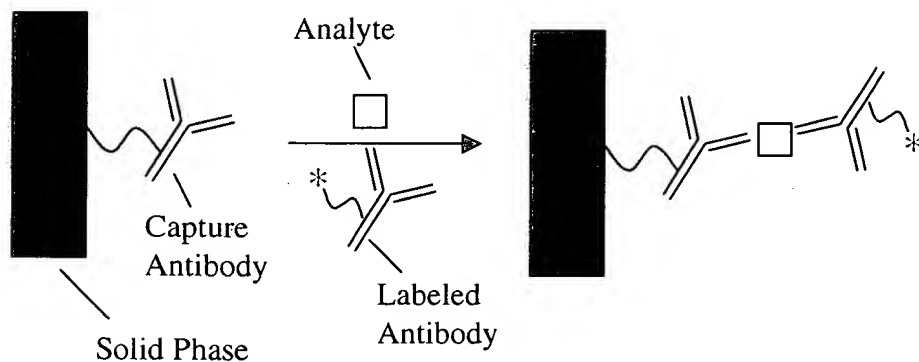
Shibue + Leventis:



- Binding of analyte decreases ECL signal from ECL moieties on antibody immobilized on particle.
- ECL moieties are in suspension and diffuse to the electrode.
- Analytes distinguished on the basis of color.

A

Solid Phase Binding Assays



Binding events measured through the use of a detectable label ().*

<i>Detection Technique</i>	<i>Label</i>
Radioactivity Measurement	Radioisotopes: ^{125}I , etc.
Fluorescence Measurement	Fluorophore: Fluorescein, etc.
Agglutination	Particle: Latex Bead, etc.
ELISA	Enzyme: Alkaline Phosphatase, etc.
Electrochemiluminescence	ECL Moiety: $\text{Ru}(\text{bpy})_3^{2+}$, etc.